What is claimed is:

1. A method for processing a plurality of channels in a statistical multiplexer, comprising the steps of:

allocating an encoding bit rate for coding a current picture of each channel according to a bit rate need parameter thereof; and

for each channel, allocating a transmission bit rate for transmitting the current picture after encoding thereof, and providing a modeled decoder buffer that receives transmitted pictures therefrom;

wherein, for each channel, the transmission bit rate is based on the channel's encoding bit rate, and is allocated following a system delay that follows the allocated encoding bit rate, to minimize a rate mismatch between an input and an output of the modeled decoder buffer.

2. The method of claim 1, wherein:

for at least one of the channels, the transmission bit rate is allowed to deviate from the channel's encoding bit rate to avoid an impending overflow or underflow event of the modeled decoder buffer.

3. The method of claim 1, comprising the further step of:

for at least one of the channels, checking for

impending overflow or underflow events of the modeled
decoder buffer to set at least one of minimum and
maximum limits on the transmission bit rates for the
channel.

4.   The method of claim 1, wherein
for at least one of the channels, when a next
update of the allocated transmission bit rate can be
implemented, following an implementation delay, before
a decode time of a next picture, a maximum limit is set
on the allocated transmission bit rate at a current
time (CT) in proportion to a fullness of the modeled
decoder buffer at a time (CT+delay), and in inverse
proportion to a time period between (CT+delay) and the
decode time.

5.   The method of claim 1, wherein
for at least one of the channels, when a next
update of the allocated transmission bit rate can not
be implemented, following an implementation delay,
before a decode time of a next picture, a maximum limit
is set on the allocated transmission bit rate at a
current time (CT) in proportion to a fullness of the
modeled decoder buffer at a time (CT+delay), and in
inverse proportion to a time period between (CT+delay)
and a decode time of a picture that follows said next
picture.

6.   The method of claim 1, wherein

for at least one of the channels, when a next update of the allocated transmission bit rate can be implemented, following an implementation delay, before a decode time of the current picture, a minimum limit is set on the allocated transmission bit rate at a current time (CT) in proportion to a number of remaining bits of the current picture to transmit at a time (CT+delay), and in inverse proportion to a time period between (CT+delay) and the decode time.

7.   The method of claim 1, comprising the further step of:

for at least one of the channels, determining whether a current allocated transmission bit rate is sufficient to transmit a number of remaining bits of the current picture in a time period between a current time and a decode time of the current picture, and, if so, maintaining the current allocated transmission bit rate in a next update cycle thereof.

8.   The method of claim 1, comprising the further step of:

for at least one of the channels, forcing the allocated transmission bit rate to a maximum value in a next update cycle thereof when a current allocated transmission bit rate is not sufficient to transmit a number of remaining bits of the current picture in a

time period between a current time and a decode time of the current picture.

9. The method of claim 1, wherein

for at least one of the channels, when a next update of the allocated transmission bit rate can be implemented, following an implementation delay, before a decode time of a next picture, a maximum limit is set on the allocated transmission bit rate at a current time to avoid an overflow of the modeled decoder buffer at the decode time.

10. The method of claim 1, wherein

for at least one of the channels, when a next update of the allocated transmission bit rate can not be implemented, following an implementation delay, before a decode time of a next picture, a maximum limit is set on the allocated transmission bit rate at a current time to avoid an overflow of the modeled decoder buffer at a decode time of a picture that follows said next picture.

11. The method of claim 1, wherein:

for at least one of the channels, when a next update of the allocated transmission bit rate can be implemented, following an implementation delay, before a decode time of the current picture, a minimum limit is set on the allocated transmission bit rate at a

current time such that the current picture is completely transmitted before the decode time.

12. The method of claim 1, wherein:

for at least one of the channels, when a next update of the allocated transmission bit rate can not be implemented, following an implementation delay, before a decode time of the current picture, a minimum limit on the allocated transmission bit rate at a current time is set to a maximum value to mitigate a potential underflow of the modeled decoder buffer.

13. An apparatus for processing a plurality of channels in a statistical multiplexer, comprising:

means for allocating an encoding bit rate for coding a current picture of each channel according to a bit rate need parameter thereof; and

means for allocating a transmission bit rate for transmitting the current picture after encoding thereof, and providing a modeled decoder buffer that receives transmitted pictures therefrom, for each channel;

wherein, for each channel, the transmission bit rate is based on the channel's encoding bit rate, and is allocated following a system delay that follows the allocated encoding bit rate, to minimize a rate mismatch between an input and an output of the modeled decoder buffer.